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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/007,531	10/26/2001	Ken A. Nishimura	100100321-1	2565

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EXAMINER	
LEE, DAVID J	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 10/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/007,531	NISHIMURA ET AL.	
	Examiner	Art Unit	
	David J. Lee	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) 1-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 26 October 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 03/12/2004.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 5-6, 8-9, 11-12, 14-17, 20-22, and 25 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Killat (US Patent No. 4,442,550).

Regarding claim 1, Killat teaches a method for performing time-domain equalization of an information signal represented by an optical signal, said method comprising: receiving the optical signal (fig. 1, 20); optically splitting the optical signal into beams (fig. 1, 22); optically delaying at least one of the beams (fig. 1- the beams are optically delayed); detecting a plurality of the beams to generate respective electrical signal components (fig. 1, 24 & 26); and combining a plurality of the electrical signal components to generate an electrical output signal representing the information signal (fig. 1, 28).

Regarding claim 5, Killat teaches the method of claim 1, wherein optically splitting the optical signal includes: providing a beamsplitter; and performing the splitting using the beamsplitter (fig. 1, 22).

Regarding claim 6, Killat teaches the method of claim 1, wherein optically splitting the optical signal includes: providing a diffractive optical element; and

performing the splitting using the diffractive optical element (fig. 3, 42 – the grating produces diffracted orders, col. 5, line 1).

Regarding claim 8, Killat teaches the method of claim 1, wherein: in optically delaying at least one of the beams, the at least one of the beams is delayed relative to at least one other of the beams (fig. 1, the beams are optically delayed); and optically delaying at least one of the beams includes: providing a first optical path and a second optical path; directing the at least one of the beams via the first optical path; and directing the at least one other of the beams via the second optical path (fig. 1 – twelve optical paths are shown and the delayed beams are directed down each optical path).

Regarding claim 9, Killat teaches the method of claim 8, wherein the first optical path is physically longer than the second optical path (col. 3, lines 10-11).

Regarding claim 11, Killat teaches the method of claim 1, wherein, in optically delaying at least one of the beams, each of the beams is delayed relative to every other of the beams (col. 3, lines 10-11).

Regarding claim 12, Killat teaches the method of claim 1, wherein, in combining the plurality of electrical signal components, at least one of the electrical signal components is summed negatively (col. 4, lines 19-23 & lines 53-55: $S_1(t)$ is summed negatively to $S_2(t)$).

Regarding claims 14 and 21, the beams entering detector 24 of figure 1 can be considered the first sub-beams and the beams entering detector 26 of figure 1 can be considered the second sub-beams. With this consideration in mind, Killat detects the first sub-beams with detector 24 to generate respective first electrical signal sub-

components, $S_1(t)$ and detects the second sub-beams to generate respective second electrical signal sub-components, $S_2(t)$. Combining $S_1(t)$ and $S_2(t)$ with amplifier 28 will generate the electrical output signal.

Regarding claims 15 and 22 and applying the considerations above, by summing the first electrical signal sub-components and summing the second electrical signal sub-components and subtracting these sums, an electrical output signal can be generated. See column 4, lines 19-32 for Killat's explanation of this method.

Regarding claim 16 and applying the considerations above, an electrical output signal can be generated by subtracting each of the first electrical signal sub-components (the beams entering detector 24) from a corresponding one of the second electrical signal sub-components (the beams entering detector 26) to generate a respective one of the electrical signal components and summing these electrical signal components.

Regarding claim 17, Killat teaches the method of claim 14, further comprising: providing a splitter and performing the splitting and the dividing using the splitter (fig. 1, 22).

Regarding claim 20, Killat teaches a system for performing time-domain equalization of an information signal represented by an optical signal, said system comprising: means for receiving the optical signal (fig. 1, 20); means for optically splitting the optical signal into beams (fig. 1, 22); means for optically delaying at least one of the beams (fig. 1, the beams are optically delayed); means for detecting a plurality of the beams to generate respective electrical signal components (fig. 1, 24 &

26); and means for combining plurality of the electrical signal components to generate an electrical output signal representing the information signal (fig. 1, 28).

Regarding claim 25, Killat teaches a system for performing time-domain equalization of an information signal represented by an optical signal, said system comprising: a beamsplitter adapted to split the optical signal optically into beams (fig. 1, 22); a delay component optically communicating with the beamsplitter (col. 3, lines 6-11: the delay lines have different lengths and communicate with the beamsplitter 22), the delay component being configured to receive at least one of the beams and delay the at least one of the beams optically (col. 3, lines 6-11); an array of photodetectors arranged to receive the at least one of the beams (fig. 1, 24 & 26), the array of photodetectors being adapted to generate respective electrical signal components corresponding to the at least one of the beams (fig. 1, 24 & 26); and an amplifier arranged to receive the electrical signal components, the amplifier being adapted to generate an electrical output signal representing the information signal (fig. 1, 28).

3. Claims 1, 2-4, 8-9, 11, 14, 18, 20, 23-24 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Lewis (US Patent No. 5,555,119).

Regarding claim 1, Lewis teaches a method for performing time-domain equalization of an information signal represented by an optical signal, said method comprising: receiving the optical signal (fig. 1, and col. 8, lines 26-27); optically splitting the optical signal into beams (col. 8, lines 26-27); optically delaying at least one of the beams (fig. 1, 18a-18e, and col. 8, lines 28-29); detecting a plurality of the beams to

generate respective electrical signal components (fig. 1, 20a-20e, and col. 8, lines 50-51); and combining a plurality of the electrical signal components to generate an electrical output signal representing the information signal (fig. 1, 21).

Regarding claim 2, Lewis teaches the method of claim 1, further comprising: optically scaling at least one of the beams (col. 8, lines 29-30, and fig. 10a, 119).

Regarding claim 3, Lewis teaches the method of claim 2, wherein, in detecting the plurality of the beams, at least one of the beams detected has not been subjected to at least one of (a) the delaying, and (b) the scaling (fig. 1, 18a).

Regarding claim 4, Lewis teaches the method of claim 1, further comprising: electrically scaling at least one of the electrical signal components (fig. 1, 22a-22e).

Regarding claim 8, Lewis teaches the method of claim 1, wherein: in optically delaying at least one of the beams, the at least one of the beams is delayed relative to at least one other of the beams (fig. 1, 18a-18e, and col. 8, lines 28-29); and optically delaying at least one of the beams includes: providing a first optical path and a second optical path; directing the at least one of the beams via the first optical path; and directing the at least one other of the beams via the second optical path (i.e. - fig. 1, the first path: 18b, and the second path: 18c).

Regarding claim 9, Lewis teaches the method of claim 8, wherein the first optical path is physically longer than the second optical path (col. 8, lines 28-29).

Regarding claim 11, Lewis teaches the method of claim 1, wherein, in optically delaying at least one of the beams, each of the beams is delayed relative to every other

of the beams (fig. 1, 18a-18e, and col. 8, lines 28-29: each beam has different lengths and therefore is delayed relative to each other).

Regarding claim 14, the beam is split into a plurality of beams, and line 18a of figure 1 can be considered as the first sub-beam, line 18b can be considered as the second sub-beam. Applying this consideration to the rest of the claim, Lewis discloses that the detecting the plurality of beams includes detecting the first sub-beams (18a) to generate respective first electrical signal sub-components and detecting the second sub-beams (18b) to generate respective second electrical signal sub-components (the detectors are 20a-20e); and wherein combining the plurality of electrical signal components includes summing the first and second electrical signal sub-components to generate the electrical output signal (fig. 1, 21: the combiner sums the first and second electrical sub-components).

Regarding claim 18, Lewis discloses the method of claim 14, wherein optically scaling at least one of the beams includes attenuating at least one of the first sub-beam and the second sub-beam of the at least one of the beams to set the intensity ratio. Since Lewis discloses that the beam can be sent through an amplifier, the sub-beams are all attenuated (col. 8, lines 29-31).

Regarding claim 20, Lewis teaches a system for performing time-domain equalization of an information signal represented by an optical signal, said system comprising: means for receiving the optical signal (fig. 1, and col. 8, lines 26-27); means for optically splitting the optical signal into beams (col. 8, lines 26-27); means for optically delaying at least one of the beams (fig. 1, 18a-18e, and col. 8, lines 28-29);

means for detecting a plurality of the beams to generate respective electrical signal components (fig. 1, 20a-20e, and col. 8, lines 50-51); and means for combining plurality of the electrical signal components to generate an electrical output signal representing the information signal (fig. 1, 28).

Regarding claim 23, Lewis teaches the system of claim 20, further comprising: means for optically scaling at least one of the beams (fig. 10a, 119).

Regarding claim 24, Lewis teaches the system of claim 20, further comprising: means for electrically scaling at least one of the beams (fig. 1, 22a-22e).

4. Claims 1, 2, 5, 8, 10, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Wickham et al. (US Patent No. 6,708,003).

Regarding claim 1, Wickham teaches a method for performing time-domain equalization of an information signal represented by an optical signal, said method comprising: receiving the optical signal; optically splitting the optical signal into beams (fig. 1, 14, col. 3, line 66); optically delaying at least one of the beams (fig. 1, 28, and col. 4, lines 15-16); detecting a plurality of the beams to generate respective electrical signal components (fig. 1, 18, and col. 4, lines 24-25: Wickham discloses that the optical detector may be a detector array for detecting a plurality of beams); and combining a plurality of the electrical signal components to generate an electrical output signal representing the information signal (fig. 1, 18: generates the electrical output signal).

Regarding claim 2, Wickham teaches optically scaling at least one of the beams (fig. 4, 23, col. 7, lines 23-25)

Regarding claim 5, Wickham teaches wherein optically splitting the optical signal includes: providing a beamsplitter; and performing the splitting using the beamsplitter (fig. 1, 14, col. 3, line 66: an optical splitter is interpreted as a beamsplitter).

Regarding claim 8, Wickham teaches in optically delaying at least one of the beams, the at least one of the beams is delayed relative to at least one other of the beams (col. 4, lines 16-18: Wickham discloses that each of the beams has its own modulator for delaying each beam); and optically delaying at least one of the beams includes: providing a first optical path and a second optical path; directing the at least one of the beams via the first optical path; and directing the at least one other of the beams via the second optical path (fig. 1-after being split at 14, the delayed beams are provided several optical paths and directed via those paths).

Regarding claim 10, Wickham teaches that each of the first optical path and the second optical path is defined, at least in part, by an optical transmission medium having an effective refractive index; and the effective refractive index of the optical transmission medium of the first optical path is greater than the effective refractive index of the optical transmission medium of the second optical path (col. 6, lines 7-14).

Regarding claim 13, Wickham teaches in scaling at least one of the beams, the at least one of the beams is optically attenuated relative to at least one other of the beams (col. 7, lines 10-13: Wickham discloses that each beam has its own amplitude modulator for scaling the corresponding delayed beam).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lewis in view of Killat.

Regarding claim 7, Lewis differs in the claimed invention in that Lewis does not disclose a diffractive optical element to perform the splitting and scaling. Killat, from the same field of endeavor, teaches a diffractive optical element to perform the splitting and scaling (col. 4 line 68 to col. 5, line 2). It would have been obvious to an artisan at the time of the invention to incorporate the diffractive optical element of Killat into the system as indicated by Lewis to split the beam into diffracted orders (col. 5, lines 1-2). This is based on a recognition that the claimed difference exists not as a result of an attempt by the applicant to solve a problem but merely amounts to selection of expedients known to the artisan of ordinary skill as design choices.

7. Claims 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewis.

Regarding claim 25, Lewis teaches a system for performing time-domain equalization of an information signal represented by an optical signal, said system comprising: a delay component (fig. 1, 18a-18e), the delay component being configured to receive at least one of the beams and delay the at least one of the beams optically;

an array of photodetectors arranged to receive the at least one of the beams, the array of photodetectors being adapted to generate respective electrical signal components corresponding to the at least one of the beams (fig. 1, 20a-20e); and an amplifier arranged to receive the electrical signal components; the amplifier being adapted to generate an electrical output signal representing the information signal (fig. 1, 22a-22e and 21). Although Lewis does not expressly disclose that the splitting is done by a beamsplitter, Lewis does disclose that the beam is split into fiber lines. Therefore, if it is not inherent, it is obvious that there must be a beamsplitter in the system of Lewis.

Regarding claim 26, Lewis discloses an attentuator optically communicating with the delay component and the array of photodetectors, the attenuator being configured to scale at least one of the beams and provide the at least one of the beams to the array of photodetectors after scaling (col. 8, lines 29-30).

Regarding claim 27, Lewis discloses an attentuator electrically communicating with the array of photodetectors and the amplifier, the attenuator being configured to scale at least one of the electrical signal components and provide the at least one of the electrical signal components to the amplifier after scaling (fig. 1, 22a-22e).

8. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Killat in view of Ogura (US Patent No. 5,375,004).

Killat discloses all the limitations of claim 19 as discussed above except for that limitation of a polarization-dispersive device. Ogura, from the same field of endeavor, teaches a polarization-dispersive device (fig. 1, 2, and col. 3, lines 22-23); passing each

of the plurality of beams through the polarization-dispersive device to separate the beams into the respective first sub-beam and second sub-beam; and rotating a polarization direction of at least one of the plurality of the beams to set the intensity ratio of the respective first sub-beam and second sub-beam (col. 3, lines 31-37). One of ordinary skill in the art would have been motivated to incorporate a polarized beam splitter as indicated by Ogura in the system of Killat because the use of the polarized beam splitter as a light dividing device results in an advantage that the utilization rate of light is high and there is a minimization in light loss.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David J. Lee whose telephone number is (571) 272-2220. The examiner can normally be reached on Monday - Friday, 9 am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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